



VOLUME XV JULY 1959 NUMBER 7

3 [ **Clinical**  
**Proceedings**  
OF THE  
2 [ **CHILDREN'S HOSPITAL**  
1 [ **WASHINGTON, D. C.**

**ENURESIS**

<b>LITERATURE REVIEW</b>	
<i>Hyun-Wha Kim (Oh), M.D.</i> .....	153
<b>A PEDIATRICIAN'S VIEW</b>	
<i>John H. McLeod, M.D.</i> .....	172
<b>A PSYCHIATRIST'S VIEW</b>	
<i>Reginald S. Lourie, M.D.</i> .....	175
<b>THE EDITOR'S COLUMN: THE RECOGNITION OF COAGULATION DEFECTS AND BLOOD DYSCRASIAS PRIOR TO OPERATION.</b>	180
<b>CLINICAL PROCEEDINGS NOTE</b> .....	inside back cover

when baby's **hungry-cry**  
causes bothersome phone calls...



specify **Lactum**<sup>®</sup> to help you avoid troublesome formula changes

**20 cal./fl. oz. from birth**

Because it is so well tolerated, Lactum can be fed at the usually recommended 20 calories per ounce from birth.

The newborn infant's hunger is thus adequately satisfied, and the infant is enabled to adjust to normal feeding intervals.

In various clinical studies <sup>1, 2, 4</sup> Lactum has been found to adequately meet the needs of full term infants from birth through the formula feeding period.

...specify *Lactum* Modified milk formula, Mead Johnson, liquid • "infant" powder

#### Resume of Clinical Studies

Infants Satisfactorily Fed on Lactum or Dextri-Maltose<sup>®</sup>  
Modified Formulas Essentially Similar to Lactum

No of Infants	Investigators	Comments
180 (newborn)	Hatfield, Simpson and Jackson <sup>1</sup>	All infants vigorous; made satisfactory progress.
57	Frost and Jackson <sup>2</sup>	Mean height and weight curves slightly above normal; normal or superior general development.
130 (sick & well infants)	Henrickson <sup>3</sup>	Satisfactory results. Average hospital stay: 5.5 days; average daily weight gain: 3 ounces.

<sup>1</sup>Maltose-dextrins formula modifier, Mead Johnson

1. Hatfield, M. A.; Simpson, R. A., and Jackson, R. L.: J. Pediat. 44: 32-45 (Jan.) 1954.  
2. Frost, L. H., and Jackson, R. L.: J. Pediat. 39: 585-592 (Nov.) 1951. 3. Henrickson, W. E.: GP 8: 51-56 (Oct.) 1953. 4. Litchfield, H. R.: Arch. Pediat. 61: 917 (Dec.) 1944.



**Mead Johnson**  
Symbol of service in medicine

# CLINICAL PROCEEDINGS OF THE CHILDREN'S HOSPITAL

2125 13th Street, N.W., Washington 9, D. C.

---

## EDITOR-IN-CHIEF

J. WILLIAM OBERMAN, M.D.

## EXECUTIVE EDITOR

GORDON LOUD

## EDITORIAL ASSISTANT

MAY LONGSTREET

## EDITORIAL BOARD

ROBERT H. PARROTT, M.D.  
FREDERIC G. BURKE, M.D.

JOSEPH M. LoPRESTI, M.D.  
E. CLARENCE RICE, M.D.

SYDNEY ROSS, M.D.

## MANAGING EDITORS

GEORGE J. COHEN, M.D.

MILTON S. GLATT, M.D.

GRACE H. GUIN, M.D.

## ASSOCIATE EDITORS

JOHN BAYLY, M.D.  
LEONARD B. BERMAN, M.D.  
DAN FERIOZI, M.D.  
MAX FISCHER, M.D.

SANFORD LEIKIN, M.D.  
MARVIN I. MONES, M.D.  
MARSHALL M. PARKS, M.D.  
GEORGE WILLIAM WARE, M.D.

RALPH D. WHITLEY, M.D.

THE RESIDENT STAFF: ROBERT M. ABRAMS, M.D., ANDREW G. ARONFY, M.D., TIMOTHY H. DALEY, M.D., MARY Z. DAUGELA, M.D., DONALD W. DELANEY, M.D., FREDERICK W. FLOYD, M.D., DORIS GIBBONS, M.D., LORETTA K. GILMORE, M.D., CLAIRE LOUISE HAMMEL, M.D., NICHOLAS P. HARITOS, M.D., GUSTAVO HERNANDEZ, M.D., WELLINGTON HUNG, M.D., HUBERT JOCKIN, M.D., IRADJ MAHDAVI, M.D., JOHN A. MARCHESANI, M.D., ALBERT MONIZ, M.D., JOHAN R. POLEY, M.D., ROBERT D. RENTO, M.D., DRAGO SCHMIDT, M.D., M. ADNAN SHARKEYIAH, M.D., ROLAND F. STEBBINS, M.D., WILLIAM N. STERLING, M.D., DONALD W. WICZER, M.D., HANS-JOACHIM WIGGER, M.D., MARIA WUNDERLICH, M.D., AND ROBERT L. ZAHN, M.D.

RESEARCH FELLOWS: JOHN J. CROTTY, M.D., GEORGE C. EMMANOULIDES, M.D., GLORIA D. ENG, M.D., SEYMOUR Z. GOLDBLATT, M.D., PETER B. KAMIN, M.D., CHRISTINE W. KEHNE, M.D., HYUN-WHA KIM (OH), M.D., BELINDA C. STRAIGHT, M.D., EDITH S. TAYLOR, M.D., AND LETICIA U. TINA, M.D.

PUBLICATIONS COMMITTEE OF THE MEDICAL STAFF: ROBERT H. PARROTT, M.D., *Chairman*, FREDERIC G. BURKE, M.D., PRESTON A. McLENDON, M.D., E. CLARENCE RICE, M.D., SYDNEY ROSS, M.D., J. WILLIAM OBERMAN, M.D., AND GEORGE WILLIAM WARE, M.D.

PUBLISHED MONTHLY BY THE STAFF AND RESEARCH FOUNDATION OF THE CHILDREN'S HOSPITAL, WASHINGTON, D. C.

Cases are selected from the weekly conferences held each Friday at 12:30 P.M., from the Clinicopathological conferences and from weekly Staff meetings.

This bulletin is printed for the benefit of the present and former members of the Attending and Resident Staffs, and the clinical clerks of Georgetown and George Washington Universities.

Subscription rate is \$3.00 per year. Those interested make checks payable to "Clinical Proceedings Dept., The Children's Hospital, Washington, D. C. Please notify on change of address.

---

Copyright 1969, Children's Hospital

Second-class postage paid at Washington, D. C.



u  
c  
u  
c  
f  
c  
  
n  
e  
l  
f  
v  
c  
  
a  
u  
c  
c  
u  
;  
  
a  
a  
H  
in  
C  
t  
g  
t

# Enuresis: Literature Review

HYUN-WHA KIM (Oh), M.D.\*

## INTRODUCTION

Enuresis is usually defined as unintentional, involuntary, generally unconscious and predominantly nocturnal voiding. It is frequently used synonymously with bed-wetting. The voluntary control of urination is a social custom and not an organic necessity; the urinary act in infancy occurs as a lower reflex arc but it generally becomes a conscious function under cerebral control by the thirtieth month. The average child is dry both day and night by the time he is 3 years of age, so that wetting up to this time should not be considered pathological unless it recurs after a completely dry period.

Enuresis may be partial or complete, nocturnal or diurnal, occasional or regular, organic or psychogenic (also frequently called true, functional, essential or idiopathic); it may be confined to childhood or extend into adult life. Gerard<sup>1</sup> differentiates enuresis, or involuntary wetting of psychic origin, from incontinence, or wetting resulting from physical causes. Diurnal wetting, or pants-wetting, accompanies nocturnal enuresis in approximately one-third of cases, but occurs alone only uncommonly.

It is generally said that about 16 per cent of the population between the ages of 3 and 15 years have enuresis.<sup>2</sup> When one says "enuresis," he is usually considered to mean "true enuresis" which comprises 90 to 95 per cent of all cases of enuresis; this is a purely functional disorder and has no connection with organic disease of the nervous or urogenital systems. If untreated, the great majority of cases of enuresis cease at puberty.

## HISTORY

From the historical point of view, it is not known when enuresis became a medical problem, but enuresis was recognized as a childhood abnormality at least as early as the year 1550 B.C. Glicklich<sup>3</sup> states that The Papyrus Ebers, dated that year, contains a prescription entitled "a remedy for incontinence of urine," which contained juniper berries, cyprus and beer. Glicklich has done an extensive survey of ethnographic literature and states that enuresis constitutes a problem in at least several primitive tribes in geographically widely separated areas. She has confirmed the impression that it is not specifically related to the conditions of modern civilization,

\* Research Fellow in Virology, Children's Hospital.

and describes primitive tribes in Africa who used frogs which they placed on the back of the enuretic child; prayers also were offered for enuretics. According to Pinck,<sup>4</sup> the medical writings of the Middle Ages and Renaissance periods contain numerous references to the care of patients with enuresis. Among the therapies prescribed were the ingestion of burnt crop of a cock, testicle of a hare prepared in fragrant wine, and the ground lung of a kid.

In 1751, an incontinence clamp, described as a yoke made of iron and covered with velvet, was used for the control of the totally incontinent patient. Somewhat later in the 18th century, new concepts of anatomy and pathology were beginning to influence medical thought, and application of blisters to the sacrum for the treatment of enuresis was recommended, since it was thought that most of the nerves enervating the bladder passed through the foramina of the os sacrum. During the 19th century, due to social pressure, enuresis began to assume more importance as a medical problem. Many fanciful theories were propounded, and drugs prescribed then are still in use, e.g., strychnine, belladonna in various forms, and chloral hydrate. It was at the turn of the 20th century that the psychological origin and treatment of enuresis was first considered; with subsequent years this aspect of the problem has been duly emphasized.<sup>3-5</sup>

#### ETIOLOGY

The causes proposed for enuresis are varied, and actually much concerning the etiology of enuresis is not known. The majority of authors agree that enuresis is usually psychogenic in origin but that an organic etiology must be first excluded by careful examination. In the past, there have been many factors to which enuresis was commonly ascribed. Bleyer<sup>6</sup> mentions circumcision, meatotomy, and tonsilloadenoidectomy, together with eye-strain, the male prepuce, small urethral meatus, vaginitis or pyelitis, defective posture, malnutrition, etc. He concludes that clinical analysis of certain factors commonly held accountable for enuresis failed to show their relation to enuresis.

#### *Toilet Training*

Opinions concerning toilet training vary considerably according to different authors; some authors recommend the induction of the training schedule during the early months of life, saying "training for bladder control may be begun as early as the third month, since infants left untrained after the seventh or eighth month are conditioned with difficulty to the use of the toilet," or, "it is important that training be started during the first six months of life, even if such training cannot be conducted in a highly systematic manner."<sup>7</sup> They suggest that up to the age of 6 months,

the child should be placed on the toilet on rising, after meals, bathing, morning and afternoon naps, and at bed-time in order to acquaint him with the essentials of the voluntary process.<sup>8</sup> Others<sup>9</sup> stress the importance of waiting "for the necessary degree of development" and suggest that the time is probably ripe when the child is able to balance firmly on his legs.

It is important that early training be undertaken without zealousness but with moderation and solicitude. The time schedule for toilet training suggested by Ilg and Ames<sup>10</sup> is that the child at the age of 2 years may be "dry at night if taken up" and should be able to "verbalize his toilet need fairly consistently." They state that there is no "proper age" for staying dry and further that practically all children go through the same stages which lead up to this desired ability, but each one makes his own time table.

Almost invariably, children are able to stay dry for the relatively short duration of nap time considerably before they are able to stay dry all night. In the normal course of events, many babies wake dry from their naps as early as one year of age. By 18 months many are reasonably well regulated in the daytime so far as toileting is concerned, though the responsibility for keeping the child dry is still the mother's. The child does not yet indicate his toilet needs, but will wait a reasonable length of time for an opportunity to use the toilet. By 2 years the average child will be dry in the morning on waking if he is taken up during the night. This however is often disturbing to the child of this age, and Ilg and Ames<sup>10</sup> do not as a rule advocate it. They state that by 3 years of age many children are dry all night without being taken up. Boys are slower than girls in this respect. For many children it will be long past 2 or even long past 3 years of age before they can stay dry all night.

The child's awareness or concern over wet pants usually means that there will soon be no more wet pants, and dryness after the nap means that one can at least start hoping for dry nights. Until these two preliminary steps have been taken, it is largely useless to look for final control. The mother may take note of the natural rhythms of micturition and of the times of the day when the child responds most promptly to a routine toilet placement, and she can especially watch for the time when he wakes up dry from his nap. This is one of the truest indications of maturing ability to withhold micturition. It may occur during the last quarter of the first year, but usually is not established before 13 or 15 months. When the capacity to withhold has been obtained, the response to the toilet training usually is immediate, and the previously resistant child begins to complain of, and at the same time shows more awareness of, wetting and of the puddles that he produces on the floor. Although there is a difference of opinion concerning the optimum time for the induction of a training program, there is general



agreement among many writers that the training schedule be based upon the child's own physiological rhythm.<sup>11</sup> The assumption that the baby shows a rhythm or periodicity in voiding implies that it would be reasonable to expect micturition to occur at fairly regular intervals over a period of time. Such intervals would presumably show regularity with respect to the clock or the sleeping or feeding schedule. McGraw,<sup>11</sup> investigating two sets of twin boy infants, concluded that early toilet training is futile and stated that it is preferable to postpone training until evidence of control participation in the act of micturition is manifested.

As to whether to wake the child thoroughly when picking him up at night, opinions differ considerably. Ilg and Ames<sup>10</sup> do not wake him, and recommend carrying him to the bathroom only if he is small and easy to pick up; if larger they recommend letting him function in a bottle if he is a boy. Picking him up at night is merely palliative, and is useful only in order to keep him dry and warm and to reduce the laundry. Picking him up does not teach him to stay dry; therefore waking him does little good and may do serious harm, in that once awakened, he may not be able to get back to sleep. A sleepless child may be more troublesome to himself and others than a wet child. However, indications for picking up and waking are probably different at different ages. Even up through 2 or 3 years of age, many children are better off if not picked up during the night. By 4 or 5 years of age, if the child is still not consistently dry at night, picking the child up once, two or three hours after he goes to sleep, may insure dryness and is obviously well worth while. Some children are dry some nights without being picked up and tend to wet only after an especially exciting day; such children need to be picked up only on such nights.

Children at the age of 1 year, 2 years, and 2½ years are very preoccupied with and show distinct pride and pleasure in the act of excretion.<sup>12</sup> The main part of the pleasure in the act, i.e. the sensory pleasure of the fecal or urinary mass passing over the anal or urethral mucosa becomes displaced to the genitals, where it simulates the pleasure in the sexual act.<sup>12</sup> This displacement is probably conditioned biologically and constitutionally, and furthered by the process of cleansing the genitals and training in bladder control.

It is evident that cleanliness is not innate but occurs only as the result of training. Training interferes with free instinctual expression and therefore will leave an imprint on later forms of instinctual life. At the same time that the child is developing an increased interest and pleasure in his excretory activities, he has been acquiring more voluntary control over his motor system. At this stage, the child places a high value on his excretions and when the child loves his mother who loves him, he gives up the love of these excretory products, thereby giving her "a valuable gift." But if



mother annoys him, he retaliates by focusing on his excretory products and activities.<sup>12</sup>

The method of toilet training has further-reaching consequences than simply the attainment of cleanliness by the child because so many important ideas and concepts are connected with it in the child's mind. By the time the pyramidal tracts begin to function and make possible voluntary control of the lower centers (about the time the child starts to walk), the child is endeavoring to imitate all adult activities. If a little before this time regularity in toilet habits is observed, without any maternal reaction to failure but with some slight praise for success, the child will soon endeavor to be grown-up and behave as adults do, and will quickly and easily attain habits of cleanliness. If the adult gives the process undue importance, far-reaching effects harmful to psychological development may be instituted.

#### *Psychogenic Factors in Enuresis*

Psychogenic factors most commonly encountered include emotional tensions, social frustrations, thwarted strivings and sibling competitions. The psychogenic conception of enuresis maintains that this is an external manifestation of intrapsychic conflict of one type or another. Though not always the case, enuresis is often but one of a number of difficulties presented by the same patient who may show marked passivity, shyness, and conformity, with underlying resentment and fear; sometimes temper tantrums, anorexia, and extreme negativism are present.

There is no question that voluntary control of urination may be lost under situations of stress and strain, particularly if they are frightening to the individual. English and Pearson<sup>13</sup> state that psychological disturbances may cause a decrease in the voluntary control of the urethral sphincter, resulting in involuntary voiding. They liken enuresis to disturbances of the anal sphincter, except that in the latter, retention (constipation) is more common, while in the former, incontinence (enuresis) is more common. Bostock and Shackleton<sup>14</sup> investigated 41 enuretic children and suggested that the main etiological factor in this condition may not be a rigid toilet training routine *per se*, but rather an interference with the timetable which nature has evolved for maturation of urinary control. Thirty-five of these 41 children had had early toilet training. Sweet<sup>15</sup> believes that enuresis is due to one or any possible combination of three psychological conditions in the child: 1) The child has not grown up with particular reference to control of the bladder even though other functions are normal. Sweet states that these children have had poor habit training, and have lacked sympathy and understanding from their parents. 2) The child subconsciously wishes to remain in, or return to, the protected nonresponsible stage of infancy rather than to assume the realities of his own age. 3) The child has a strong

subconscious resentment against his parents which is manifested as aggression. Latent hostility and aggressive traits frequently occur in enuresis.

Gerard's series<sup>1</sup> of chronic enuretic children disclosed a psychogenic etiology to the enuresis in 84.7 per cent of cases. All of these presented definite neurotic patterns of which wetting represented only one symptom in the syndrome. There appeared to be a common factor of fear of harm from persons of the opposite sex. Gerard states that this fear, in turn, probably develops as a result of three factors working together: 1) destructive wishes toward the rival parent, 2) traumatic sexual experience or information, and 3) experience of parental seduction or rejection, depending upon the sex of the child. In a psychoanalytic study of 6 cases in this series, Gerard found three main patterns. The first pattern was that of regression, in which the wetting developed as part of an episode of total personality regression to a more infantile level of behavior. This regression, in turn, was precipitated by jealousy of a new sibling. The second pattern she called a revenge-response pattern. In this, the child retaliated with wetting or soiling as well as with general stubbornness against nagging or punitive attitudes of the mother or person training him. The third pattern was the hysterical pattern, in which the wetting was one expression of a symptom complex resulting from an hysterical form of identification with the father.

Katan's series<sup>16</sup> of enuretic children revealed similar findings to those of Gerard. One group of her children consisted of those whose training in cleanliness had been completed by a beloved person from whom the child had then been separated. After the loss of the love object the child regressed, relinquished the newly acquired developmental step, and began to wet again. If it were possible to replace the beloved person by another suitable object, the child again achieved control of urinary function. In a second group, the symptom appeared after birth of a baby brother or sister. Jealousy of the baby played a very large part here. In a third group of children, the symptom appeared at the discovery of the difference between the sexes; this sometimes coincided with the birth of a baby sister or brother. Katan also mentions a form of enuresis caused by trauma from a necessary operation for which extensive treatment is necessary.

#### *Organic Factors in Enuresis*

By many, organic enuresis is not considered as true enuresis. However, exclusion of an organic etiology is very important in the differential diagnosis of enuresis. Organic enuresis is considered to be that due to pathologic changes in the urinary tract; these lesions are predominantly of the lower tract. Campbell,<sup>17</sup> in his series of children with persistent enuresis, found two-thirds of his cases due to organic etiology, and emphasizes that when intensive medical treatment is unsuccessful after a two or four month trial,

the child is entitled to a complete urologic examination. In such cases, he outlined a routine investigation as follows:

- 1) Careful physical examination with special attention to the central nervous system, particularly in respect to the deep tendon reflexes of the lower extremities and alterations in perineal sensation.

- 2) Careful examination of the urine including culture. He found urinary infections in one fourth of these patients.

- 3) Estimation of residual urine. There was a high incidence of residual urine in Campbell's children with persistent enuresis. Amounts of residual urine varying from 10 to over 300 cc., with an average of 25 to 45 cc., were found in 16.9 per cent of his cases. He considered residual urine to mean either lower urinary tract obstruction or neuromuscular disease, and that such residual urine not only predisposed to infection but caused variable changes in the upper urinary tract.

- 4) A plain roentgenogram of the urinary tract and vertebral column. Urinary calculi or spinal defects, particularly spina bifida occulta associated with myelodysplasia may be discovered.

- 5) Cystogram. A hypotonic bladder has been found to fill the entire pelvis; in certain cases of lower urinary tract obstruction either of intrinsic origin, or due to neuromuscular disease, there has been enough vesicoureteral reflux to outline the entire upper urinary tract.

- 6) Cystourethroscopic examination. Urethrotigonitis is the most commonly observed lesion in girls, while congenital obstruction along the urethra (particularly meatal stricture) is the usual etiologic factor in boys.

- 7) Cystometric observations to study alterations in the neuromuscular balance.

Campbell also comments that 90 per cent of all enuresis is due to psychogenic causes, so that 9 out of 10 cases may be cured by medical and psychotherapeutic means. Johnson and Marshall's series<sup>5</sup> of 455 cases of refractory enuresis included 48 per cent due to organic etiology.

Spina bifida occulta has been thought to be an etiologic factor of enuresis by many writers. The incidence of spina bifida occulta in the general population without enuresis is said to be between 5 to 10 per cent; as such it is usually an incidental finding of roentgenographic examination of the lumbosacral spine. Karlin's series<sup>18</sup> revealed an 84 per cent incidence of spina bifida occulta in his patients with enuresis and an incidence of 54 per cent in a control group. He concluded that the incidence of spina bifida occulta in 54 per cent of normal children corresponds closely with what has been reported concerning the percentage of spina bifida occulta in children with enuresis, and states that these figures certainly do not warrant the conclusion that there is a definite correlation between enuresis and spina bifida occulta. Further, he states that spina bifida occulta may be con-

sidered an organic basis of enuresis only in those cases which show an extensive involvement of the vertebrae in the lumbosacral region, or which, in addition to a mild defect of a vertebra, present one or more confirmatory signs as described under the symptom complex of "myelodysplasia" which consists of enuresis, a superficial lumbosacral anomaly and roentgenographic evidence of spina bifida occulta. According to Karlin, Virchow, in 1875, was the first one to employ the term "spina bifida occulta" and to call attention to its association with lumbosacral hypertrichosis. Knowledge of the possible relationship of enuresis and spina bifida occulta dates from 1909, when Fuchs (quoted by Karlin) made systematic investigations of recruits in the Vienna garrison who suffered from enuresis; as a result of his clinical findings in 24 recruits, he described a clinical syndrome named by him "myelodysplasia."

Karlin states that two theories may be advanced to support the view that there is a correlation between enuresis and spina bifida occulta in the lumbosacral region. The first theory postulates a defect in the lumbosacral roots or in the spinal cord, possibly a myelodysplasia of the conus medullaris. The second theory explains the origin of the symptoms as caused by the presence of bands and adhesions pressing on the spinal cord or on the cauda equina. In support of the first theory he states that in a frank case of spina bifida, weakness of the bladder is usually present; others, however, state that in spina bifida there is usually evidence of lumbosacral root degeneration producing a clinical picture which may resemble a lesion of the cauda equina.

The evidence of relationship between spina bifida occulta and enuresis is as yet uncertain. Campbell's series of patients with persistent enuresis revealed only 15.2 per cent with spina bifida occulta.<sup>17</sup> Sanford and Kliman<sup>18</sup> investigated 196 cases of enuretic naval recruits for spina bifida occulta together with a control group of 181 cases; the results revealed an incidence of 31 per cent in both study group and control group. Their conclusions failed to support the hypothesis that enuresis has a strong association with spina bifida occulta.

#### *Other Suggested Etiologies of Enuresis*

Cord bladder resulting from some pathological disturbance of the central nervous system may sometimes be a cause of incontinence of urine. Defective cerebral control of the bladder reflex, or its disturbance by faulty deep sensation may present with incontinence of urine as well.<sup>6</sup> Other theories of sympathetic-parasympathetic imbalance have been proposed; some think that enuresis is the result of a local spasm due to hypervagotonia,<sup>20</sup> while others believe that enuresis results from an inadequate conditioned reflex development.<sup>21</sup>

In both grand mal and petit mal epilepsy, incontinence of urine occurs

during the periods of unconsciousness. Hysteria may also present with incontinence of urine during the hysterical episode. Diabetes mellitus and diabetes insipidus present with polyuria and often incontinence of urine as well. However, the incontinence of urine seen in these diseases is not true enuresis, and incontinence associated with neurological and physical causes should not be included as causes of enuresis.<sup>1</sup>

Thickened bladder musculature has been blamed for enuresis since anatomically the male bladder musculature is thicker than that of the female, and enuresis is more frequent in males than in females. Fatigue has been thought to be a cause of enuresis, but there is no definite evidence to this effect. Deep sleep has been blamed for enuresis by many writers, since most of the enuretics are said to be "deep sleepers." Ditman and Blinn<sup>22</sup> investigated this aspect in 25 randomly selected male enuretics, ranging in age between 5 and 20 years. Twenty-two of these subjects were naval recruits 17 years of age or older. Continuous nocturnal electroencephalograms were recorded in all with electrodes placed in the temporal, parasagittal-central, and occipital areas over the subdominant hemisphere. Ditman and Blinn concluded that nocturnal enuresis can occur at any level of sleep; the electroencephalographic evidence indicated that these subjects were physiologically awake at the time of enuresis, outward appearance notwithstanding. They believe that functional nocturnal enuresis is not due to excessively sound sleeping, and for adult enuretics, at least, a diagnosis of dissociative reaction is indicated. Teicher<sup>23</sup> states that the depth of sleep has been blamed for enuresis but that many bed-wetters are light, restless sleepers; he also mentions that electroencephalographic studies of the sleep habits of bed-wetters show that their sleep level is lightest at the moment of micturition. Roland<sup>24</sup> states that 74.5 per cent in his series of enuretics had a history of usually deep sleep with difficulty in awakening. He suggests that in deep sleep the cortex is depressed relatively more than the lower parts of the central nervous system. Therefore, he postulates that the increasing stimuli from the filling bladder which would ordinarily awaken the patient before producing reflex evacuation may then cause reflex emptying before producing wakefulness. Turton and Spear<sup>25</sup> obtained electroencephalograms on 100 enuretic children and found 22 with epileptiform tracings, 28 with immature tracings, and 23 whose tracings were on the borderline of abnormality. They concluded that many enuretics who do not respond to treatment have an unsuspected physical basis for their disorder and that the electroencephalogram is an aid in diagnosis.

#### *Familial and Socio-Economic Factors*

In a large majority of cases there is a family history of enuresis in one or both parents and in siblings. Kurtz's series<sup>26</sup> of nocturnal enuresis in the adult male revealed a family history of enuresis among other siblings in

approximately 50 per cent of cases. Blomfield and Douglas' extensive study<sup>27</sup> of enuresis also disclosed a history of enuresis in siblings: 10.6 per cent of siblings of regular bed-wetters contrasted with 5.8 per cent of siblings of dry or occasional bed-wetters. McGuiness<sup>28</sup> points out that an analysis of families of children with enuresis revealed that bed-wetting was a childhood problem in one or both parents in from 30 to 40 per cent of cases of enuresis studied by various authors. In Pinck's series<sup>4</sup> 55 out of 100 families of enuretic children had such a history.

Bakwin<sup>29</sup> states that although enuresis is seen in all socio-economic groups, it is more frequent among the poor, who may pay less attention to cleanliness; who live in surroundings where inconveniently located toilets (in the hall, for example) make going there at night a difficult and perhaps a frightening experience; and whose children sleep in the same bed with siblings who also wet the bed. Blomfield and Douglas' study<sup>27</sup> revealed that the lowest incidence of bed-wetting was among children of the relatively prosperous professional and salaried groups and among the children of agricultural workers; the greatest prevalence was among the children of manual workers; and the children of semi-skilled workers occupied an intermediate position, the incidence being nearer to that of the manual workers at  $4\frac{1}{2}$  years and nearer the salaried workers at  $7\frac{3}{4}$  years. It has been thought by many that children of low intelligence have a greater incidence of enuresis. However, Bakwin<sup>29</sup> states that mental retardation is not a prominent factor except when the retardation is severe as in imbeciles and idiots; in general, children with intelligence quotients at the moron level respond to bladder training as well as those with high intelligence quotients. Lack of toilet training and faulty training have also been blamed for enuresis, as well as "small bladder" and "irritable bladder." Blomfield and Douglas<sup>27</sup> found no significant difference in incidence of enuresis when analyzed for family size, social groups, first-born and later-born children, and geographical distribution.

#### INCIDENCE

The incidence of enuresis is said to be about 16 per cent of the population between the ages of 3 and 15 years.<sup>2</sup> Zufall<sup>30</sup> quotes an incidence of 2.5 per cent of men of draft age suffering from enuresis. Psychogenic enuresis is said to account for about 90 per cent of cases, whereas organic causes account for about 10 per cent;<sup>29</sup> however, persistent enuresis or refractory enuresis has a higher incidence of organic origin. Campbell's series<sup>17</sup> revealed a 70 per cent incidence of organic enuresis. In Johnson and Marshall's series,<sup>3</sup> 48 per cent had evidence of uropathology, although Gerard's series<sup>1</sup> revealed only 9.7 per cent due to organic causes.

Most collected series of cases except those of Bleyer<sup>6</sup> and McGuiness<sup>28</sup> show a distinct preponderance of enuresis occurring in males (table 1).



TABLE 1

*Sexual Distribution of Enuresis According to Various Authors*

Author	Males	Females
Pinck <sup>4</sup> .....	62%	38%
Johnson and Marshall <sup>5</sup> .....	57%	43%
Bleyer <sup>6</sup> .....	51%	49%
Campbell <sup>17</sup> .....	52%	48%
Turton and Spear <sup>25</sup> .....	63%	37%
McGuiness <sup>28</sup> .....	50%	50%

Blomfield and Douglas<sup>27</sup> made an interesting observation concerning the difference in sexual distribution. They noted that 12.2 per cent of all children aged  $4\frac{1}{2}$  years wet their beds; and that by the age of  $7\frac{3}{4}$  years the incidence had dropped to 7.3 per cent. As regards regular bed-wetting, the boys showed no decline in prevalence during the survey period whereas the prevalence among girls dropped by about one third. Thus the difference between the sexes, which is not quite significant at  $4\frac{1}{2}$  years, is highly significant at  $7\frac{3}{4}$  years.

## THERAPY

There is no specific treatment for enuresis. Organic causes of enuresis must be treated according to etiology, and treatment of such enuresis depends on accurate urologic diagnosis. In the great majority of psychogenic cases, enuresis ceases without treatment at puberty. Thus, some take the attitude of "don't worry about bed-wetting and wait for puberty."

The treatment of nocturnal enuresis is not always successful no matter what has been done as is shown by the multiplicity of drugs and devices in current use. In general, the treatment of enuresis encompasses psychotherapy, proper training, and drug therapy. The first is centered on the child, whereas the latter two are centered on the symptom, and are called "superficial treatment" by the psychiatrically oriented physicians who hesitate to use them on the grounds that they ignore underlying emotional difficulties. It is an accepted fact that symptomatic approach to the treatment of emotional disorders is often followed by the appearance of one or more substitute symptoms which may prove more distressing than the original complaint, and that a severe emotional crisis may be precipitated during an attack on a symptom.

Symptomatic treatment includes restriction of fluids, awakening the child during the night for urination, star charts, rewards, urging responsibility, environmental changes, salty diets, drug therapy, conditioning apparatus and many others. Teicher<sup>28</sup> states that the medical profession has often forgotten that the child and not his bladder stands in the center of



any therapeutic program for enuresis, and outlines a therapeutic approach to the problem of enuresis, granted no organic disease is present. He advocates: 1) removal of punishment and disparagement associated with enuresis by all persons dealing with the child, especially the parents, and vigorous discouragement of cruel, punitive attitudes on the part of parents along with explanation of the nature of the enuresis; 2) avoidance of manipulations and drugs; and 3) the physician helping the child to view the enuresis as a symptom, and not as a "badness", to relieve his guilt. The physician becomes the child's ally and the parents' guide. Cessation of drugs and of manipulations provide the child the safest guarantee that he is not physically ill. The parents should also be assured that their child is not defective. The pediatrician can achieve a lasting result through encouragement, optimism, and a change of attitudes in the child. Gerard's series<sup>1</sup> of chronic enuresis in 72 cases revealed 84.7 per cent of psychogenic enuresis treated with psychotherapy with success after first failing when superficial treatments were tried.

Psychiatrists are not inclined to regard enuresis as a "bad habit" but rather a complex symptom in most instances. Most always, there are other behavior problems and unhealthy personality features associated with it. Associated behavior problems often include feeding problems, temper tantrums, and stealing; unhealthy personality features include whining irritability, aggressive behavior, and timidity. Much can be accomplished by proper, regular habit formation in regards to urination and defecation and an understanding, sympathetic co-operation on the part of the parents. Parents certainly do not like the bother of a wet child and damp bed, and more often than not they react with annoyance, irritation, impatience, and anger. It is certainly hard to maintain an attitude of either calm ignoring or calm disappointment if the wetting continues day after day. Yet parents' attitudes are very important because the secondary symptoms produced in the child by punishment, scolding or other measures—embarrassment, lack of self-confidence, feelings of guilt and inadequacy, feelings of difference or physical defectiveness, sensitiveness, unhappiness, feelings of defeat—may be present in varying degrees and may be as difficult to deal with as the primary symptom.

Some authors even state that it is important that the parents realize that the basic cause of functional enuresis is theirs and that they should minimize the problem in an unemotional way.<sup>5</sup> The child's sense of security and self-confidence should be built up by loving reassurance and encouragement rather than be destroyed by neurotic, egocentric, emotional parents. English and Pearson<sup>12</sup> recommend psychotherapy for a minimum of six months.

Proponents of superficial treatments, on the other hand, have inferred

that changes in emotional status related to treatment are beneficial rather than harmful, and have argued that curing the enuresis and removing anxieties which had arisen secondarily to it increase the child's self-confidence by allowing him to feel more acceptable socially.<sup>31, 32</sup> It is interesting to see how the appearance of an enuretic child improves when he is able to master his bladder for even one night. Attitudes of physicians and parents to "try anything" probably do have a place in the treatment of enuresis.

### *Symptomatic Treatment*

In the symptomatic therapy of functional enuresis, the diet should be concerned only with elimination of diuretics, as coffee, tea, or cocoa, and the use of nonconstipating foods. The limitation of fluids especially after 4:00 P.M. and a dry supper may seem logical, but has no scientific basis, for a normal well compensated bladder should accommodate itself to reasonable fluid intake.<sup>23</sup> Even though diets containing ample salt late in the day were formerly popular and are still used today, the child is usually extremely thirsty and uncomfortable. Some authors, however, recommend 5 grains<sup>5</sup> to 5 grams<sup>23</sup> of salt or a very salty sandwich before retiring in order to bind fluid so that less urine will be in the bladder.

Star charts and rewards are sometimes effective, especially in young children of 5 to 7 years of age who may be getting stars for good behavior at school. Results of this method, however, are not too promising.

Belladonna or atropine are probably the most frequently used drugs. Pharmacologically, atropine is a parasympathetic inhibitor, and on this basis is indicated in cases of parasympathetic imbalance to achieve a relatively greater tonicity of the vesical outlet of the "hypertonic bladder" and greater relaxation of the detrusor muscle with corresponding increased vesical capacity.<sup>33</sup> This drug is contraindicated in the atonic type of bladder disturbances. Bakwin<sup>29</sup> states that, of the many drugs which have been used in the treatment of enuresis, the only one which has endured is belladonna. He further states that it is highly effective when used according to a definite plan and for a long enough time. He believes that bladder capacity is increased in some enuretics, and that discomfort, when experienced, is slight. He points out that most failures with belladonna treatment are due to inadequate dosage and a half-hearted approach. Children occasionally develop a drug idiosyncrasy, so that the dose must be increased gradually. Bakwin recommends an initial safe dose for a child of 5 years to be 10 drops of the tincture. For children who have urgency, with or without wetting during the day, the drug is given three times a day. When daytime symptoms are not troublesome, it is given only at bedtime. The dosage is increased each day by one drop per dose until a therapeutic or toxic effect is obtained. Thus, 10 drops three times a day are given on the first day, 11

drops three times a day on the second day, and so on. The child is to be checked at 10- or 14-day intervals to determine efficacy of treatment or the appearance of toxic manifestations. Bakwin states that it is usually possible to give doses up to 30 to 40 drops three times a day without producing toxicity. He adds that belladonna should be continued for 8 or 10 weeks after the enuresis has ceased, in order that training methods may have had time to become effective. Withdrawal of the drug should be gradual, over a period of two weeks. Toxic effects are usually mild; symptoms include flushing, dryness of the throat, and pupillary dilatation. Bakwin also stresses that treatment with belladonna should be combined with proper bladder training. After belladonna has reduced the amount of wetting at night, he introduces night awakening and also recommends a conditioning apparatus.

Vignec, Moser, and Julia<sup>34</sup> treated 44 institutional enuretic children with Donnatal Elixir Plus<sup>®</sup> which contains a mixture of phenobarbital, belladonna alkaloids and B-complex vitamins. The dosage given was  $\frac{1}{2}$  teaspoonful three times a day for the 1 to 3 year old,  $\frac{1}{2}$  to 1 teaspoonful three times a day for the 3 to 6 year old, and 1 teaspoonful three times a day for the older child. They concluded that belladonna derivatives, atropine in particular, are useful. Effectiveness was 41.7 per cent in their series.

For the atonic bladder, ephedrine has been reported to have favorable results, as have Dibenzylamine<sup>®</sup> and Urecholine<sup>®</sup>. Their recommended use is based on their parasympathomimetic action. Higham<sup>35</sup> observed 16 enuretics ranging in age from 4 to 30 years. He states that treatment of enuresis should be directed toward increasing the bladder volume and at the same time waking the child when the bladder is becoming full and before the reflex of micturition is initiated. He further states that a tablet or two of ephedrine, methyl ephedrine, or amphetamine will assist in completing the wakening of the child, but the parents must be warned that drug therapy will not, in itself, cure enuresis. The duration of treatment in his series ranged from two weeks to six months. All patients showed considerable increase in bladder capacity and 2 cases were cured after two weeks' treatment.

In cases of so-called familial enuresis, daily methyltestosterone administration has been used without much effect on the theoretical basis that enuresis is due to genitourinary immaturity. Zufall<sup>36</sup> used methyltestosterone linguets, 5 mg. four times a day for a one week period, in 3 adult male cases without improvement. Chorionic gonadotropin, given twice weekly in increasing dosage until a maximum of 1.0 cc. is given, has been used on the same basis, and without improvement.<sup>5</sup>

Amphetamine is a sympathomimetic drug which resembles ephedrine in a number of respects but differs from it chiefly in possessing greater

ability to stimulate the higher central nervous system centers, particularly the cerebral cortex. The hypothalamus, primarily its lateral and possibly its posterior areas, is known to be associated with both the mechanism of micturition and of sleep-waking. It is stated that sleep is brought about by a break between the cortex and brain stem, probably in the hypothalamus.<sup>36</sup> Some consider that normal sleep is the result of an interplay between the cortex and the hypothalamic sleep-waking center. Some writers have found that stimulation of the hypothalamic region induces contraction of the bladder, and others have shown that bilateral cortical lesions produce signs of release of the bladder reflexes and an increase in the response to detrusor stretch. The action of the hypothalamic center for micturition is dependent on the intact motor fibers descending through the internal capsule. It is well known that subcortical lesions in the frontal region may cause both incontinence and excessive sleep, as distinct from coma. After the operation of prefrontal leucotomy, the combination of drowsiness, deep sleep, and urinary incontinence during the first week or two postoperatively is common. There seems to be an anatomic-functional relationship between deep sleep and urinary incontinence. Roland<sup>24</sup> studied 51 cases of enuresis treated with d-amphetamine according to its sleep-opposing action; 5.0 mg. of d-amphetamine sulfate in an elixir was given at bedtime for one week. Patients were asked to void before going to bed and set an alarm clock to ring four hours later. The treatment was unsuccessful. The dose was then increased up to 10 mg. with the same routine awakening. Forty-seven out of 51 (92 per cent) treated were relieved of enuresis within three weeks and remained dry at night with only rare incontinence for at least six months. Roland concludes that the treatment with d-amphetamine sulfate has a rational physiologic basis, is inexpensive, lacks toxicity or hazard, and can be recommended for treatment. Zufall,<sup>30</sup> however, reports that of 53 cases of enuresis in adult males treated with amphetamine, 20 mg. by mouth at bedtime for one or two weeks, 43 were unimproved, 9 somewhat improved, and 1 markedly improved; none of them was cured.

As reserpine has been shown to have a definite effect on the different stimuli to the hypothalamus, it was felt that reserpine could possibly exert a braking effect on the bladder, thereby preventing the involuntary emptying of the bladder during sleep. Lambros<sup>37</sup> studied 16 cases of enuresis treated with reserpine; in all 16 cases the patients stopped bed-wetting within three nights and this control continued at least three months, one patient being controlled for 10 months. In 10 cases bed-wetting recurred on discontinuation of the medication. In the remaining 6 cases where medication was continued the patients were maintained under complete control. The dosage of reserpine used ranged from 0.75 mg. to 1.5 mg. The author suggests further study.

Banthine® is known to depress transmission of nerve impulses at the site of the postganglionic parasympathetic nerves and it is here that alteration of detrusor activity in enuresis is thought to occur, although the possibility of a central nervous system effect cannot be excluded. Parasympathetic depressant agents are capable of providing inhibition at a level immediately proximal to the end organ, (in this case, the bladder), and would cause, in part, inhibition to bladder emptying which would appear to be lacking in enuresis. Keizur and Hodges<sup>38</sup> studied 13 cases of enuresis, ranging in age from 5 to 23 years, treated with methantheline (Banthine®) and propantheline (Pro-Banthine®). The patients were started on oral medication regardless of cystometric findings. Initially, a single dose of 25 mg. was given at bedtime; later, if necessary, the dose was increased to 50 to 75 mg. in order to secure the desired degree of bladder inhibition. Additional aids such as restriction of fluid after the evening meal, waking the patient at 1:00 A. M. for voiding, and a second dose of methantheline were also utilized. In several patients, a six-hour schedule of drug therapy was utilized. Methantheline, 25 mg., was administered orally every six hours along with a 50 mg. dose at 10:00 P. M. or 11:00 P. M. to inhibit bladder emptying through the remainder of the night. Propantheline was given in a similar manner, but in smaller doses (15 and 30 mg.). In 12 out of the 13 cases, frequency of bed-wetting was markedly diminished. Three patients became symptom free except for occasional accidents following excessive fluid intake after the evening meal or during periods of illness. Propantheline was found equally effective to methantheline and, in addition, propantheline was more pleasant to take and produced fewer objectionable side effects. Duration of the drug treatment was determined by the time required to establish dry patterns of behavior. The authors concluded that the use of long-acting parasympathetic blocking agents as a medical crutch combined with evaluation and control of psychogenic factors would appear to offer a new approach to the problem of enuresis. Zufall<sup>39</sup> also treated 10 adult enuretic patients with methantheline, 100 mg. four times a day by mouth for two to four week periods, and reported that no change in the frequency of bed-wetting was found. Leys<sup>39</sup> treated 33 enuretic children with propantheline bromide, 15 mg. daily for the first four days and 45 mg. daily for the following six days. At the same time a control group of 32 enuretic children ranging in age from 5 to 15 years was also observed. He concluded that propantheline bromide used in this way has a small (5 per cent) but definite effect in diminishing the number of episodes of enuresis, an effect which disappears in the post-treatment period. Mayon-White<sup>40</sup> tried propantheline in 8 enuretic children and at the same time observed a control group of enuretics. He concluded that propantheline failed to influence the result of routine treatment.

Bostock and Eckert<sup>41</sup> studied 170 cases of enuretic children; they treated

13 patients with either chlorpromazine or pipradrol hydrochloride and noted considerable improvement in regard to both enuresis and mental outlook. They believe that a trial of chlorpromazine hydrochloride, in dosage of 10 to 25 mg. three times a day, or pipradrol hydrochloride, 1 to 2 mg. at night, is indicated in those cases in which there are associated disturbances, including disorders ranging from restless irritability to gross disturbance of mood. When deep sleep is believed to play a role, pipradrol hydrochloride was suggested as the drug of choice, possibly as an alternative to amphetamine. Treatment with chlorpromazine appeared to have no effect on the incidence of "dry nights," although in some cases the general nervous condition was improved, especially in those cases in which there was an associated problem of over-anxiety, undue irritability, or temper tantrums.

In one series of cases,<sup>41</sup> methoscopolamine bromide (Pamine®), was used in dosage of 2.5 mg. twice daily in conjunction with a bladder-training routine. In addition, up to 5 mg. was given at bedtime. The regimen was found to be a specific treatment for pants-wetting, although it had no effect on "dry nights."

Marson<sup>42</sup> treated 4 adolescent enuretic patients with posterior pituitary powder inhaled as snuff. His patients were instructed to avoid fluids within three hours of sleep, and immediately before retiring inhaled approximately 100 mg. of posterior pituitary extract. In all 4 cases there was a marked reduction in the incidence of enuresis during pituitrin treatment. Pituitrin snuff is variously reported as acting for 5 to 10 hours, and the shorter the period of sleep the more effective preventive effect it should have. Marson suggests that it may well prove of little value in children requiring upwards of 12 hours' sleep, but in adolescents and adults sleeping for eight to nine hours, its effect is likely to persist for a long enough period and should thereby affect an over-all reduction in urine production during the period of sleep. Untoward side effects were not observed during this trial.

Marshall<sup>43</sup> treated 5 cases of persistent enuresis in adults with sacral neurotomy, and reported partial to complete cure in 3 cases. He suggests that, on developmental grounds, an empirical reduction in the nerve supply to the bladder should increase sphincter tonus, decrease detrusor tonus sensitivity, and produce a normal balance. He divided nerve fibers originating from the second sacral segment on both sides and crushed those from the third on one side in order to interfere temporarily with only part of the components of the nervi erigentes. In the typical case, the scales swung strongly to the side of retention for several days, a balance between the two functions being recovered in 10 days or so.

Although Pinck<sup>4</sup> believes that the empiric use of urethral dilatation, faradic stimulation, hydrotherapy and massage of the trigone in the absence of pathologic states is to be condemned, Bleyer<sup>6</sup> recommends massage of the bladder in diurnal enuresis, saying that it is good practice to try the



effect of massage a few times at intervals of one or two days in a patient with diurnal enuresis before atropine is prescribed. He states that cures in his series of 252 cases of enuresis amounted to about 80 per cent and were accomplished by measures directed to the bladder itself, and concludes that atropine and massage of the trigone are the only effective treatment for enuretics. Bakwin<sup>29</sup> has also quoted favorable reports of urethral dilatation.

Alarm devices of various sorts, set into motion by contact with urine, have been advanced to establish a conditioned reflex; their recommended use is based on Pavlov's theory of conditioned reflexes. This treatment has been recommended by many writers. The theory of successful treatment is based on the establishment of a conditioned reflex involving the bladder sphincters. Behrle and associates<sup>44</sup> treated 20 enuretic children (12 boys and 8 girls) with the apparatus described by Seiger<sup>31</sup> in 1952, and concluded that the method proved effective in either entirely eliminating or markedly improving the enuresis in 15 of the series (75 per cent) regardless of their emotional states prior to treatment; he noted that none of the children appeared to suffer significant undesirable effects as a result of the treatment. Johnson and Marshall<sup>5</sup> also recommend an apparatus treatment which assists in the formation of a normally conditioned bladder reflex, and they add further that this type of treatment is the best generally available treatment in functional enuresis. Bakwin<sup>29</sup> and Ilg and Ames<sup>10</sup> as well as many others, also recommend this type of treatment.

#### SUMMARY

Even though enuresis has been known as an abnormality of childhood since long before Christ, so little is known about the etiology of this disturbing problem that little can be done for it even at present. It is most important to exclude an organic etiology in this condition, since according to the literature, there has been a relatively high percentage of unrecognized organic etiology occurring especially in cases of chronic or refractory enuresis. Debate exists as to the proper treatment of enuresis; one school is centered on the child, the other centered on the symptom. At present, psychotherapy is the most recommended therapy for functional enuresis; however, trained psychiatrists and psychologists are limited in their time, and the number of enuretics among the population is great. By becoming the enuretic child's ally and properly guiding his parents, the practicing physician can fill a real need, and share responsibility for helping him on the road to controlling his symptom.

#### REFERENCES

1. GERARD, M. W.: *The Emotionally Disturbed Child*; papers on diagnosis, treatment and care, New York, Child Welfare League of America, 1957, p. 130.
2. Editorials and Comments, Nocturnal Enuresis, *J.A.M.A.* **154**: 509, 1954.
3. GLICKLICH, L. B.: An historical account of enuresis, *Pediatrics* **8**: 859, 1951.



4. PINCK, B. D.: A physiologic approach to enuresis, *Am. Practitioner*. **7**: 1272, 1956.
5. JOHNSON, S. H. III, AND MARSHALL, M., JR.: Enuresis, *Pennsylvania M. J.* **58**: 485, 1955.
6. BLEYER, A.: Clinical study of enuresis, *A.M.A. Am. J. Dis. Child.* **36**: 989, 1928.
7. SCOE, H. F.: Bladder Control in Infancy and Early Childhood, University of Iowa Studies. *Studies in Child Welfare*, 1933, vol. 5, no. 4.
8. Blatz, W. E.: Development and training of control of the bladder, *Genetic Psychology Monographs* **4**: 116, 1928.
9. ALDRICH, C. A., AND ALDRICH, M. M.: *Babies are Human Beings*, New York, The Macmillan Co., 1938, p. 92.
10. ILG, F. L., AND AMES, L. B.: *Child Behavior*, New York, Harper & Brothers, 1955, p. 106.
11. MCGRAW, M. B.: Neural maturation as exemplified in the achievement of bladder control, *J. Pediat.* **16**: 580, 1940.
12. ENGLISH, O. S., AND PEARSON, G. H. J.: *Common Neurosis of Children and Adults*, New York, W. M. Norton & Company Inc., 1937, p. 27.
13. *Ibid.*, p. 118.
14. BOSTOCK, J., AND SHACKLETON, M. G.: The maturation factor in enuresis, *Med. J. Australia*. **43**: 1042, 1956.
15. SWEET, C.: Enuresis, psychologic problem of childhood, *J.A.M.A.* **132**: 279, 1946.
16. KATAN, ANNY: *The Psycho-analytic Study of the Child: Experience with enuretics*, New York, International Universities Press, 1946, vol. 2, p. 241.
17. CAMPBELL, M. F.: Clinical study of persistent enuresis, *N. Y. State J. Med.* **34**: 190, 1934.
18. KARLIN, I. W.: Incidence of spina bifida occulta in children with and without enuresis, *A.M.A. Am. J. Dis. Child.* **49**: 125, 1935.
19. SANFORD, S. P., AND KLIMAN, G. W.: Enuresis and spina bifida occulta, *U. S. Armed Forces M. J.* **8**: 507, 1957.
20. SICARD, J. A.: Incontinence nocturne d'urine (enuresie), *Annales de Med.* **17**: 470, 1925.
21. SCHACHTER, M.: Die Pathogenese der Enuresis, *Jahrb. f. Kinderh.* **140**: 234, 1933.
22. DITMAN, K. S., AND BLINN, K. A.: Sleep levels in enuresis, *Am. J. Psychiat.* **111**: 913, 1955.
23. TEICHER, J. D.: Enuresis; critical review of symptom, *California Med.* **82**: 392, 1955.
24. ROLAND, S. I.: Essential nocturnal enuresis treated with d-amphetamine sulfate, *J. Urol.* **71**: 216, 1954.
25. TURTON, E. C., AND SPEAR, A. B.: E.E.G. findings in 100 cases of severe enuresis, *Arch. Dis. Childhood*. **28**: 316, 1953.
26. KURTZ, C. W.: Nocturnal enuresis in the adult male; a study of twenty-five cases, *Medical Bulletin of the U. S. Army, Europe*. **13**: 170, 1956.
27. BLUMFIELD, J. M., AND DOUGLAS, J. W. B.: Bedwetting; prevalence among children aged 4-7 years, *Lancet* **1**: 850, 1956.
28. MCGUINNESS, A. C.: Treatment of enuresis in childhood, *Med. Clin. N. America*. **19**: 287, 1935.
29. BAKWIN, H.: Symposium on pediatric urology; enuresis, *Pediat. Clin. N. America*. **2**: 819, 1955.
30. ZUFALL, R. B.: Adult male enuresis study of 200 cases, *J. Urol.* **70**: 894, 1953.
31. SEIGER, H. W.: Treatment of essential nocturnal enuresis, *J. Pediat.* **40**: 739, 1952.
32. DAVIDSON, J. R., AND DOUGLASS, E.: Nocturnal enuresis; special approach to treatment, *Brit. M. J.* **1**: 1345, 1950.

33. AMBERG, S., AND GROB, O.: Effect of atropine on bladder of child, *A.M.A. Am. J. Dis. Child.* **41**: 507, 1931.
34. VIGNEC, A. J., MOSER, A., AND JULIA, J. F.: Treatment of chronic enuresis, poor weight gain, and poor appetite in institutional children, *Arch. Pediat. N. Y.* **74**: 119, 1957.
35. HIGHAM, A. R. C.: Approach to problem of simple enuresis, *Proc. Roy. Soc. Med.* **46**: 849, 1953.
36. KLEITMAN, N.: Sleep, *Physiol. Rev.* **9**: 624, 1929.
37. LAMBROS, V. S.: Use of reserpine in certain neurological disorders: organic convulsive states, enuresis, and head injuries. *Ann. New York Acad. Sc.* **61**: 211, 1955.
38. KEIZUR, L. W., AND HODGES, C. V.: Control of enuresis by parasympathetic blocking agents, *Northwest Med.* **53**: 27, 1954.
39. LEYS, D.: Value of propantheline bromide in treatment of enuresis, *Brit. M. J.* **1**: 549, 1956.
40. MAYON-WHITE, R. M.: Controlled trial of propantheline in bed-wetting, *Brit. M. J.* **1**: 550, 1956.
41. BOSTOCK, J., AND ECKERT, J. P.: Enuresis and pants-wetting in children: a survey of some simple therapies, *Med. J. Australia.* **44**: 284, 1957.
42. MARSON, F. G. W.: Posterior pituitary snuff treatment of nocturnal enuresis, *Brit. M. J.* **1**: 1194, 1955.
43. MARSHALL, C. J.: Persistent adult bed-wetting treated by sacral neurotomy, *Brit. M. J.* **1**: 308, 1954.
44. BEHRLE, F. C., ELKIN, M. T., LAYBOURNE, P. C.: Evaluation of a conditioning device in the treatment of nocturnal enuresis, *Pediatrics* **17**: 849, 1956.

#### ADDITIONAL BIBLIOGRAPHY

- Council on Physical Medicine and Rehabilitation: S & L Enuresis Alarm, Model D., *J.A.M.A.* **154**: 59, 1954.
- GRIGGS, W. B.: Enuresis of childhood with confirmed homeopathic therapeutics, *Hahnemannian* **88**: 161, 1953.
- PEARSON, G. H. J.: *Emotional Disorders of Children*; Case Book of Child Psychiatry, New York, W. M. Norton & Company, Inc., 1949, p. 42.
- ROBERTIELLO, R. C.: Some psychic interrelations between the urinary and the sexual systems with special reference to enuresis, *Psychiat. Q.* **30**: 61, 1956.

---

## Enuresis: a Pediatrician's View

JOHN H. McLEOD, M.D.\*

I shall try not to be too dogmatic on the subject of enuresis since I feel that there are still many unknown factors involved in this condition and the last word on the subject has not yet been said. When I discuss enuresis, I shall confine myself to the child who is of average intelligence, above the

\* Senior Advisory Staff, Children's Hospital.

age of 4 years, free from organic disease of the central nervous system, pancreas, and urological system, and yet wets the bed from one to several nights monthly.

Unfortunately, we are inclined to direct our efforts in the treatment of enuresis towards obtaining a dry bed, losing sight of the fact that there are usually many other problems involved. To me, enuresis is but a symptom of an ill child in an ill environment. What are the etiologic factors producing enuresis as one symptom in this ill child? Is the autonomic innervation of the urinary bladder and its sphincter inherently a little different in these children? Is he the type of youngster with marked reactions to all environmental stimuli and whom we sometimes call hypertonic? What about his bladder capacity and the brain center producing the sensation to urinate? Are these a little different in this type child than in his more placid brother? Do the time and strength of the stimulus to urinate vary in their development, being early in some infants and children and late in others? Does the bladder sphincter of one child open with a smaller amount of urine than another and consequently cause him to wet the bed because his sensation to urinate was not strong enough to awaken him? In children with enuresis, is the relationship between the endocrine glands with their autonomic innervation and the emotions just a bit off balance? We know that involuntary urination and defecation do occur under severe emotional strain.

In turning to the emotional factors involved in the etiology of this problem, I wonder if our present day teaching concerning toilet training and many other habits should not revert slightly to the customs of the primitive North American Indians, thus relieving the pressures on the infant and young child and so avoiding the strained parent-child relationship which is usually present consciously and subconsciously in these cases. I believe that too early and too rigid training, in order to lessen the work load and sometimes to furnish boastful conversation at cocktail and tea parties by fatigued, overworked, and frustrated parents blessed with many children born at short intervals, tends to create serious emotional disturbances in many a child. This occurs especially in those children with the anatomical and physiological setup which I have tried to picture in the preceding paragraph. As the child becomes older, there is present the picture of parental nagging, displeasure, and varying kinds and degrees of administered punishment causing inferiority feelings and hostility in the child towards the parents and others in the environment. As the battle continues, there also frequently develop in other systems and organs with autonomic innervation, symptoms such as excess sweating, neurodermatitis, nervous cough, asthmatic states, obscure abdominal pain, constipation, colitis, ties, stammering, night terrors, and many other psychosomatic and behavior problems not acceptable to society.

The patient with enuresis must be either very rich or very poor in order

to have a thorough work-up, i.e., in addition to a detailed history and physical examination he may be given a thorough urological and neurological work-up with the necessary x-ray studies together with psychological evaluation. I might say at this point that should a spina bifida occulta be found, I do not feel that this is the answer to the enuresis, since it has been proved time and again that this is not so.

Without these elaborate and expensive studies, the pediatrician making the diagnosis of enuresis on a psychogenic basis will probably be correct 99 times out of 100. He should first inform the parents to prepare for a lengthy period of treatment with frequent relapses, since, much as we would like one, there is no rapid cure at present. He will have to become his own psychiatrist, explaining to both parents and the child, if old enough, the nature of the trouble. He should be understanding and sympathetic to the parents with their problem and not arouse their hostility by blaming them for their child's condition. He will have to try to change the parent-child relationship by having the parents change their attitude in handling their enuretic child from one of rejection to one of acceptance and tolerance. There should be no displeasure shown or punishment administered, even by innuendo. Such statements as "naughty girl," "bad boy," etc. should be taboo. As for the child, the physician must stand back of him with kindness, encouragement, and the reassurance that he will get well. Usually the physician will also be discouraged and frustrated, but if he will carry on, eventually he will see a bit of progress as he gets parental co-operation. I believe that most enuretics will eventually recover even without treatment, because very often things in the environment change for the better as far as the child is concerned. The duration of illness will vary in direct proportion to the degree of emotional disturbance and to the degree of co-operation in treatment by the parents and the child. However, the skill and interest of the physician is also a big factor. Should an enuretic child and his parents not be welcome in the crowded office of a very busy pediatrician, the case should be referred to some other physician or psychiatrist.

I shall leave it to the psychiatrist to tell about the subconscious motivation of the enuretic child with its primary and secondary gain factors and the use of enuresis as a means of expressing hostility toward the parents. In an emotionally disturbed child, I believe we should reduce the sedatives and tranquilizers and give ten times the dose in psychotherapy.

Along with large doses of psychotherapy to the parents, some of us prescribe small doses of tincture of belladonna to the child, or a reduction of the liquid intake after supper, or awakening the child one, two, or three times between bedtime and morning to have him void. Also used is a mechanical device consisting of an alarm and battery and two aluminum sheets, one of which is perforated, with a sheet of cloth between. This is

placed on the mattress on which the child sleeps. The circuit is completed when he starts to void, setting off an alarm which awakens him. He then is expected to get up, turn off the alarm, and complete the job of voiding, but not in the bed. All of these therapeutic measures may be used along with psychotherapy provided they do not further disturb the child.

In conclusion, the best treatment of enuresis and its other accompanying emotional problems is their prevention, if possible. We cannot change the inheritance of a certain physiology and nervous system, but by giving proper parental guidance in toilet training and building other healthy parent-child relationships, we can certainly reduce the number of these disturbed children. Maybe we should follow the old Indian custom of moving the teepee, and not start rigid toilet training too early; this may avoid throwing both mother and child into a severe, unnecessary emotional strain.

---

## Enuresis: a Psychiatrist's View

REGINALD S. LOURIE, M.D.\*

Essentially, enuresis is the most frequent of the symptoms of a behavior nature that one encounters in pediatric practice. As a matter of fact, some attempts to assay the frequency have shown that as many as 20 per cent of children who are seen in a general pediatric clinic have been enuretic for some period of their lives.

Enuresis is indeed a symptom. What it is a symptom of is another problem, but it should be repeated that there can be an organic as well as an emotional basis for enuresis. A primary organic basis exists in about 2 per cent of enuretics. When there is actual anatomical difficulty in these patients such as disease or malformation, the pattern is fairly specific. Instead of episodic wetting, there is a pattern of actual loss of control and dribbling.

In children whose enuresis is on an emotional basis, we may often see a definite constitutional element. These children seem to have small, irritable bladders which easily respond under pressure or stress. However, when life goes smoothly, the autonomic mechanisms involved stay under control and there is little or no enuresis. These are the children who often get wound up

\* Attending Staff, Director, Psychiatry, Children's Hospital; Associate Clinical Professor, Pediatric Psychiatry, George Washington University School of Medicine.

in many other ways and become overexcitable and hard to control, are easily overstimulated, or show other symptoms which indicate something is different in their autonomic makeup.

However, in looking at what sets up the symptom of enuresis, we find that there are many factors that may enter in. In the first place, there may be cultural factors. This brings to mind a situation which I encountered in the Navy when we were screening recruits from the Ozarks. One of our Navy chiefs asked us to look at a young man of 25 who was wetting his bed. When we noticed that the recruit was a married man, we asked whether this wasn't an inconvenient symptom, but he said no, his wife wet the bed too. It also turned out that his father wet the bed, his mother wet the bed and his 80 year old grandfather wet the bed. There are also families where a parent may have wet the bed until age 12 or 14 so that the child will be expected to be enuretic until the same age. This type of enuresis comes up as an incidental finding sometime in history taking, bothers no one, and no one is asked to do anything about it.

Where bed-wetting is on an emotional basis, one common misconception is that the wetting is thought of in terms of loss of control. However, when we examine what goes on in many cases of enuresis, we find that this is anything but a loss of control. We see the case of a child who is taken to the toilet every hour or two during the night and voids each time, but then a half-hour later, is wet all over again; or the child who is awakened, does not have to use the bathroom but voids as soon as he is back in bed. We may see a child who wets in the daytime but does not wet at night. Some children wet half a dozen times a night but in the daytime may only have to void two or three times. When we begin to look at the details, we find that this is really superb control; its need and use as a symptom are what dictate the pattern that is established.

In terms of what is behind any individual case, we find that in the vast majority of these children, wetting the bed is not a very deep-seated symptom. In practice, I'm sure that many cases of bed-wetting have been stopped by simple methods, such as by limiting fluids, let us say, after four o'clock. Why is it that such an approach may or may not work? Consider a child 5 to 6 years of age who is perfectly dry until a new baby comes along; then he starts wetting the bed. The mother may stop giving him fluid after four in the afternoon and keep an eagle eye on him, and he stops wetting. However, from the child's point of view, he had gotten upset in the first place because he felt mother was spending all her time with the baby and did not love him any more; but now that she is watching him closely after four o'clock, she is really paying a lot of attention to him, and he feels she loves him after all. He no longer needs the symptom because the reason behind the symptom is gone. On the other hand, if the mother



is extremely punitive or rejecting and her child starts to wet the bed, restricting fluids usually aggravates the wetting. This child's increased symptoms seem to say: "It was bad enough before; now the old witch won't even let me have water." In other words, in the early stages particularly, the symptoms are usually pretty close to the surface, and if we know what is behind them, it is not too hard to figure out something appropriate to help in changing them.

There can be many and changing purposes and meanings to the symptom of enuresis in different children. Consider the passive child who finds that his wetting gets everybody mad. Since he does not have any easy way of getting his own anger out in the open, here is a ready-made device which he is not going to give up; no matter how it started, it is certainly now serving another but more important purpose—it can get people mad.

We find that enuresis may also come up at a time when the youngster is having a struggle in dealing with a new phase of either physical or personality development, or when he faces a specific stress such as failure in school. At such a time, the youngster subconsciously seems to say, "It's too hard being at this level of adjustment. The thing to do is to go back to a much more comfortable time." These children therefore not only begin wetting, but also regress to an earlier stage of development in their whole orientation. They may become very dependent, want to be fed and dressed, and not want to go to school. In other words, they may regress to an age where wetting was the normal and accepted behavior.

There are some children who wet on a pleasurable basis. Some people may consider this as sexual, but I do not think that in young children this is best understood directly as sexual in adult terms. The fact is that we see children in whom the pattern of enuresis does exist on the basis of its being a form of pleasure.

One of the most difficult causes of enuresis to correct is wetting that comes about as part of a child's feeling that it is helpless. The wetting becomes a very easy way to demonstrate to other people that there is a feeling of lack of control. I might cite the case of an 8 year old girl with burns, now on one of the hospital wards. When she worries whether she will ever be able to extend her arms and legs again, she stands in the doorway, voids on the floor and openly says, "I can't help myself." Incidentally, I might also cite another situation on a hospital ward where we are having an epidemic of enuresis in a group of chronically ill children under long term care. Here the aggressive component is right out in the open; the wetting gets the nurses on that ward very angry and keeps a power struggle going on.

Since there are so many possible factors underlying any case of enuresis (and we have touched on only the more frequent), there is really no substitute for sitting down and trying to find out what has changed, what has



gone wrong, what has gotten the child upset and what is keeping the symptom going. This will take more time than is usually available in a single pediatric office visit. However, when we begin to add up the number of office visits that an enuretic calls for over a period of years, it really makes sense to take an hour out to sit down and really find out what is happening in the family and to the child.

There are more than a hundred forms of treatment for enuresis and the reason that there are so many is that all of them have worked sometimes; each one of these treatments has worked in a significant proportion of cases because it has met the need at the moment. However, there is another element to be considered. Not infrequently enuresis persists long after the primary cause has disappeared even when there has not been some secondary gain or other reason for keeping it going. The enuresis then may often continue as a habit pattern. In such cases, if the timing is right at the point when the child visits the physician, no matter what treatment is prescribed, it will stop the enuresis. Such a child needs only a face-saving reason to stop, so that anything of a suggestive nature we do will work as long as the child knows what it is supposed to do.

To list the forms of treatment would be endless, but they fall into certain major categories. First is drug therapy, prescribed on one physiological basis or another. These include amphetamine to keep the child awake and more receptive to the stimulus of a full bladder, or atropine to dry him up, or a tranquilizer to relieve anxiety. The tranquilizer may work if the anxiety behind the symptom of enuresis is acute. However, if the anxiety is chronic, tranquilizers will often not help. Sometimes acute anxiety can be superimposed on chronic anxiety. In such cases, the tranquilizer may have the effect of not stopping the worrying about the underlying stress; instead the child continues to wet but does not worry about it any more.

A second category of treatment is diet therapy. Both low salt and high salt diets have worked. A third class of therapy is rather a negative approach. For example, dilatation of the urethra once a week with a larger sound each week usually works when the child realizes that he's going to end up with the largest one. It's easier to stop wetting. In other words, it is possible to take any symptom of a psychological nature and make it so uncomfortable or so uneconomical for the child that he will give it up. This is the principle behind the Navy chief's or Army top sergeant's treatment of enuresis in the service. They put two enuretic recruits in double-decker bunks without mattresses, alternating the man on top every other night. This clears up a great many cases of enuresis. On the other hand, the urologist may be very helpful to children who are worried that the enuresis means that there is something wrong with, or inadequate in, their urinary apparatus. If the urologist passes the sound with the verbal assurance that

he is fixing the apparatus, such a child may say, "Finally it's being fixed," and stop the wetting.

In another treatment category are the conditioning devices. The older gadgets gave shocks to the perineum. A newer device, by ringing a bell when a wired sheet is wet, wakes the child and eventually sets up a conditioned reflex. When it works, the child may just have needed the face-saving device to give up the enuresis. There are other cases in which it works because a child who has never been able to count on other people to control its impulse is given at least a machine which will help control it. On the other hand, many children become very upset by these devices, refuse to go to bed at night, tear up their beds, sleep on floors, and so on, because they need to keep the symptom and they are not going to get involved in something like this. At one point, about 15 years ago, we were using this device at a psychiatric institute as a means of creating experimental anxiety in certain children. Obviously, you are not going to get to the root of the problem with this machine, but conditioning may be as valid as many other such superficial approaches that one can use in selected cases. Probably one of the most effective suggestive cures used over the years by the old country doctor was to tie a string of red wool around the body at the level of the umbilicus with the knot over the spine.

I would like to suggest a routine for handling a new case of enuresis in a pediatric office. First, investigate the organic component with a good pediatric history and physical examination. Next, a urinalysis and excretory urogram should be done. If there is any question, a urologic consultation may be indicated. While this is being done, there is no harm in using one of these superficial approaches. It may be that the child is being seen at a point where he is ready to give up the symptom. Whatever you do, whether it is merely to give the child some phenobarbital at night, or a placebo, or one of the more specific physiologically-acting drugs, when you prescribe this to the child himself, you may see success because of the child's appreciation of your personal interest in him. When this works, you are a miracle doctor; when it does not work, you are facing the fact that although 80 per cent of the cases are superficial, you cannot really know what is involved until you get to the roots of it. Taking an hour aside (and incidentally, charging for it) I think is a very worthwhile way of getting information that will be of use to you in the total guidance of the family. In pediatric practice, you are looked to and respected for your guidance, but the soundness of the advice you give is determined by how much you know about the child and his background. It is only in the 20 per cent of the cases in which these superficial approaches are unsuccessful that you will need to turn to the people who deal with these problems more intensively.

## The Editor's Column

### THE RECOGNITION OF COAGULATION DEFECTS AND BLOOD DYSCRASIAS PRIOR TO OPERATION

The Medical Staff of Children's Hospital has recently issued the following memorandum:

The Medical Staff, with the concurrence of the Department of Otolaryngology, has approved a suggestion originating in the Department of Laboratories that bleeding and clotting times no longer be routine procedure for the preoperative work-up of tonsillectomy, adenoidectomy, circumcision and eye surgery patients. The reason given for the proposed change was the almost universal feeling among hematologists and pathologists that capillary tube clotting times are of little or no value in diagnosis of certain bleeding problems.

Instead, in order to reduce the likelihood of a bleeding defect in the patient coming to operation, it is now required that certain specific questions be asked of the patient or his parents and that certain specific parts of the physical examination be completed.

Therefore, the present new requirements for the preoperative management of patients undergoing tonsillectomy, adenoidectomy, circumcision, and similar procedures, are:

- 1) Completion of a new "short form," (fig. 1) including answers to questions and completion of specific parts of the physical examination concerned with bleeding or potential bleeding;
- 2) Complete blood count and urinalysis.

In addition to the above, the personnel of the Hematology Laboratory have been instructed to note any unusual bleeding tendency on the part of the patient. In the examination of the blood smear, special attention is to be paid to the presence of abnormal erythrocytes and leukocytes, and to any reduction in the number of platelets.

For many years physicians have been finding false security against the possibility of postoperative hemorrhage by using two clinical laboratory tests which clinical pathologists and hematologists have long known to be of doubtful value. The capillary tube coagulation test has been shown to give results which may be at great variance from those obtained by the more accurate Lee-White method, and the bleeding time, unless performed according to a rigidly-adhered-to technique, may give normal results when the bleeding time is actually prolonged to the critical level. Thus we come to the abandonment of two laboratory procedures which have served no useful purpose.

## GS

ng

n-

of

0-

y,

ed

ol-

sis

he

ПС

ne

e-

11,

to

to  
on

544

ry

of

to

to

ne

rv

oe

to

ne

ed

en

ne

10

10

WCP  
347

FIG. 1

It is interesting that physicians have continued to put such faith in examinations of so little merit. Possibly some of the reluctance to make a change has been due to the possible medico-legal hazards which might arise, should it be proven that serious postoperative bleeding had occurred without some evidence being at hand to show that consideration had been given by the attending surgeon to this problem prior to operation. The Section on Pathology and Laboratory Medicine of the Medical Society of the District of Columbia has gone on record as being opposed to the use of the capillary tube method of determining the coagulation time of the blood, and has recommended that all preoperative patients be questioned concerning previous personal and family histories of bleeding, and that particular attention be given in the physical examination to manifestations of bleeding, hepatosplenomegaly and adenopathy, along with a complete blood count and study of the blood film for abnormal cells, noting any evidence of a reduction in the number of platelets. If these recommendations are properly carried out it is rather unlikely that a previously unrecognized coagulation defect will be missed.

If any of the findings indicate or suggest a coagulation defect, the following examinations should be made: tourniquet test to determine capillary fragility, platelet count, bleeding time using a standardized technique, coagulation time using venous blood with multiple tubes and siliconized glassware, and prothrombin and prothrombin consumption times. The clotted blood should be observed for retractability.

In those patients on whom there is not an adequate history, Diggs<sup>1</sup> makes the suggestion that the operating surgeon, after making the first incision, should wait for a few minutes before cutting deeper to see whether there is adequate hemostasis without the use of hemostats or ties.

While evidence of previously unrecognized blood dyscrasias and coagulation defects are not uncovered very frequently, the finding of an abnormality of the white cell series or abnormalities of coagulation has on a number of occasions forestalled operations which might have ended disastrously because of hemorrhage.

E. C. R.

#### REFERENCES

1. Diggs, L. W.: Diagnosis of hemorrhagic diseases; evaluation of procedures, California M. 87: 361, 1957.

### CLINICAL PROCEEDINGS NOTE

Through the kindness of Mr. R. J. Curtin of The Baker Laboratories, the Clinical Proceedings has just been able to purchase a new tape recorder.

All our readers will agree that without a tape recorder Clinical Proceedings would have a hard time existing in its present form.

We would like to take this opportunity of publicly thanking both Mr. Curtin and The Baker Laboratories for their very kind gesture.





*they depend upon your standard of excellence*

*specify* **Vi-Sol Drops**

**Deca-Vi-Sol®**  
10 significant vitamins, Mead Johnson

**Poly-Vi-Sol®**  
9 essential vitamins, Mead Johnson

**Tri-Vi-Sol®**  
3 basic vitamins, Mead Johnson

69 separate controls—from the assays of raw materials to the closing of the tamper-proof carton—guarantee Vi-Sol quality and safety in every drop. Vi-Sol drop vitamins assure you of the purity, the sound formulation and the stable potency you want in an infant vitamin preparation. The infants under your care are precious to us, too.

VS-1159M



**Mead Johnson**  
*Symbol of service in medicine*

ce